PR 93-149

800 MHZ
PUBLIC SAFETY RADIO
COMMUNICATIONS PLAN

FOR REGION 12

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1.0 SCOPE

1.1 Introduction

In December of 1983, the United States Congress directed the Federal Communications Commission (FCC) to establish a plan to ensure that the communications needs of state and local public safety authorities would be met. By their regular means of initiation, the FCC began the process of developing such a plan. Through their efforts, and the efforts of the National Public Safety Planning Advisory Committee (NPSPAC), the plan was begun

The National Plan, as developed by NPSPAC, was followed very closely in all considerations for frequency allocation, re-use,

2. Presentations concerning the requirements for a regional planning committee were presented and discussed at state organization meetings. At each presentation there was an opportunity for persons to place themselves and/or their agency on the mailing list.

3. Letters of announcement were mailed to each major state agency radio users, those placed on the mailing list, as well as to state organizations composed of local government level public

system. Such use, on other than the five identified common channels, is to be in full compliance with FCC requirements for government use of non-government frequencies (Title 47 CFR, sec 2.103). It is permissible for a non-Federal government licensee to increase channel requirements to account for 2-10 percent increase in mobile units, dependent on the amount of Federal Government Agencies involvement in its area, provided that written documentation from Federal agencies supports at least that number of increased units.

2.5 Regional Review Committee

Upon approval of this Plan by the Federal Communications Commission, a Region Review Committee will be established for the review of applications which do not fall within the stated guidelines provided for in this plan, or for the settlement of disputes concerning this plan and/or its application.

This committee shall consist of the Local APCO Frequency Advisor for this region, a state agency representative, one representative from the Police, Fire and EMS services, and a minimum representation from other eligibles is also welcome. This committee and its composition will be assured by the Idaho APCO chapter and other Public Safety organizations. Membership on this committee will be solicited on an annual basis. Since this committee will probably not have regular business, it will be up to the Local APCO Frequency Advisor to notify the committee of problems, conflicts, or when it becomes apparent that spectrum demands will out pace available spectrum. Each member of the committee shall be furnished a copy of this plan upon their appointment or election to the committee.

Plan updates shall be accomplished by this committee. All changes or updates to the plan shall be first agreed upon by this committee and then submitted to the FCC for their review and consideration. When approved all changes shall be added to the plan with the appropriate documentation of approval.

This committee shall meet at least once annually to review the implementation of the plan. This review shall consist of examination of any and all license activity.

3.0 SPECTRUM UTILIZATION

This portion of the Plan provides a basis for proper spectrum utilization. Its purpose is to guide the Local APCO Frequency Advisor and/or the Regional Review Committee in their task of evaluating the implementation of this plan within this Region.

3.1 Region Defined

Region 12 is the State of Idaho. This region is the result of definition by the Federal Communications Commission as a result of recommendations made in the National Public Safety Planning Advisory Committee (NPSPAC) plan as submitted and approved and contained in Docket 87-112. For purposes of this plan the State of Idaho shall be defined as all the lands and waters contained within the boundaries of the State of Idaho.

3.2 Region Profile (Demographic Information)

The purpose of this section is to provide the basis for the assignment of frequencies, and their re-use. Since the frequency allocation formula used is based on population within a county, it is necessary to provide this information within this plan. Below is the data used in the determination of frequency allocations.

3.2.1 State Of Idaho Population Statistics

Forecasts for 1995 (rounded off to the nearest one thousand). Total state-wide projected population for 1995; 1,166,000.

Ada	250,000	Gem	14,000
Adams	4,000	Gooding	14,000
Bannock	76,000	Idaho	14,000
Bear Lake	7,000	Jefferson	19,000
Benewah	9,000	Jerome	18,000
Bingham	42,000	Kootenai	85,000
Blaine	16,000	Latah	32,000
Boise	4,000	Lemhi	8,000
Bonner	32,000	Lewis	4,000
Bonneville	82,000	Lincoln	4,000
Boundary	10,000	Madison	28,000
Butte	3,000	Minidoka	22,000
Camas	1,000	Nez Perce	35,000
Canyon	100,000	Oneida	4,000
Caribou	8,000	Owyhee	10,000
Cassia	22,000	Payette	19,000
Clark	1,000	Power	8,000
Clearwater	9,000	Shoshone	16,000
Custer	5,000	Teton	4,000
Elmore	23,000	Twin Falls	60,000
Franklin	11,000	Valley	8,000
Fremont	13,000	Washington	10,000

The population of the state is broken down between urban and rural residence. The urban population is some 58 percent and the rural 48 percent. The population within developed urban areas is about 58 percent or 583,000.

3.2.2 Geographical Description

There are 44 counties in the state with a total land mass of 83,557 square miles. The largest county is Idaho, with a total of 8,539 square miles.

As is shown above, the population of the state is 1,030,000 distributed across the land area contained in the state. This presents some problems in area coverage for radio systems in that the entire land area of any given jurisdiction must be covered.

The population per square mile is very sparse which generally indicates that the concentration of radio users for public safety activities is also sparse in most counties. All of these items were taken under consideration in the allocation plan.

3.3 Usage Guidelines

All systems operating within the Region having five or more channels will be required to be trunked. Those systems having four or less channels may be conventional or trunked.

The FCC, in its Report and Order states, "Exceptions will be permitted only when a substantial showing is made that alternative technology would be at least as efficient as trunking or that trunking would not meet operational requirements. Exceptions will not be granted routinely, however, and strong evidence showing why trunking is unacceptable must be presented in support of any request for exception."

Systems of four or less channels operating in the conventional mode who do not meet FCC loading standards will be required to share the frequency on a non-exclusive basis.

Public Safety communications at the state level, as it impacts the Region, will be reviewed by the Committee. State-wide public safety agencies will submit their communications plans for impact approval if they utilize communications systems within the Region and those portions of such systems must be compatible with the Regional Plan.

The next level of communication coverage will be a county/multiple municipality area. Those systems that are designed to provide area communication coverage must demonstrate their need to require such wide area coverage.

This would apply in a situation such as a city requesting coverage of an entire county. Communication coverage beyond the bounds of a jurisdictional area of concern cannot be tolerated unless it is critical to the protection of life and property. If the 800 MHz trunked radio technology is utilized, the system design must include as many county/multiple municipality government public

safety and public service radio users as can be managed technically.

The county/multiple municipality agency(ies), depending upon systems loading and the need for multiple systems within an area, must provide intercommunications between area-wide systems. In a multi-agency environment, a lead agency using the 800 MHz spectrum, which is an agency or organization having primary response obligations in the geographic area, shall be responsible for coordinating the implementation the Common Channels in this band as mandated by the National Plan. Such implementation must be reviewed and approved by the Local APCO Frequency Advisor, and at his/her discretion, the Regional Review Committee.

Municipal terminology often differs. In order to provide a title for the next level of communications the term "City" is used to define the level below county-wide. "City" communications for public safety and public services purposes must provide only the communications needed within its boundaries. However, if the total number of radios in service does not reach minimum loading criteria for a trunked system, that must consider utilizing the next higher system level if 800 MHz trunked radio is available in the area. As those higher level systems reach capacity, the smaller system communicators in public safety and public service must then consider uniting their communications efforts to formulate one large system or forfeit use of the limited 800 MHz spectrum.

Where smaller conventional 800 MHz needs are requested, those frequencies to be utilized must not interfere with the region's trunked systems. The 800 MHz trunked radio system is to be considered the higher technology at this time and in greater compliance with FCC guidelines. The amount of interference that can be tolerated depends on the service affected. Personal life and property protection shall receive the highest priority and disruptive interference with communications involved in these services in an area shall not be tolerated. Any co-channel interference within an authorized area of coverage will be examined on a case by case basis by the Regional Review Committee.

3.4 Technical Design Requirements For Licensing

3.4.1 Definition of Coverage Area or Area of Jurisdiction

The coverage area shall be that area for which a system is intended to cover with a received signal strength of greater than 40 dBu. This area shall normally represent the boundaries of the County or the incorporated municipality which is applying for license. In the case of regional or area-wide, multi-jurisdictional systems, the coverage shall be that area of all jurisdictions participating in the system combined.

3.4.2 System Coverage Limitations

System coverage shall be limited to the coverage area defined as listed above plus no more than five (5) additional miles in all directions extending from said boundaries of definition. This limitation shall assure maximum frequency reuse. The only exception to this rule shall be those applicants wishing to offer service or system use to areas outside of their jurisdictional boundaries. In these situations the applicant shall provide a proposal of said service to the Local APCO Frequency Advisor, who may request Regional Review Committee consideration, for approval.

Systems not located within the geographical center of the jurisdiction(s) for which they cover shall utilize either directional antennas or antenna/tower relationship techniques to achieve the coverage required by this plan.

3.4.3 Determination Of Coverage

There are four variables used in determining the area of coverage of a proposed system. These variables are (1) the required strength of the received signal, (2) antenna height above average terrain (HAAT), (3) the effective radiated power (ERP) of the system, and (4) the type of environment.

Received Signal Strength:
For purposes of this plan, received signal strength shall be the determining factor which defines the actual boundary of a system. The minimum signal level which marks the outer boundary of a system shall be 40 dBu.

Antenna Height:
Shall be the height of the antenna above the average terrain surrounding the tower site.

Effective Radiated Power (ERP):
The ERP is the transmitter output power times the net gain of the antenna system. The actual formula is: ERP (w) equals Power(w) times Antilog (net gain in Db divided by 10).

Environment Type:
OKUMURA/HATA METHOD - The Okumura method uses four different classifications to describe the average terrain around a transmitter site or area. The classifications are:

1-URBAN; Which is built-up city-crowded with large buildings or closely interspersed with houses and thickly-grown trees. This would include the downtown area of a major city.

2-SUBURBAN; Which is a city of highway scattered with trees, houses and buildings. This would include the downtown area of a large city.

3-QUASI-OPEN; Is an area between suburban and open areas. This includes areas outside of city limits that have few buildings and houses.

4-OPEN; Is and area where there are no obstacles such as tall trees or buildings in the propagation path or a plot of land which is cleared of anything for 300 to 400 meters ahead. This would include farm land, open fields, etc.

The Okumura/Hata method is the method resident in the computer packing program to develop this plan. A minimum system shall be permitted without special consideration when it is limited to an height of 100 feet and the transmitter is centrally located within the jurisdiction or jurisdictions participating in a system. In all jurisdictions, regardless of size, a maximum boundary radius of 8 miles shall be allowed provided adequate measures have been taken to assure that interference of existing co-channel and adjacent channel systems will not occur. Preparation of these requirements

Regardless of the type map used, the name of the applicant and the scale of the map shall be displayed on the map.

The attached table lists the field strength in Dbu/KW versus distance and antenna height for the suburban environment. The adjustment factors for the other environments relative to the suburban environment are:
Urban = Suburban - 9.7 Db,
Quasi-open = Suburban + 9.2 Db,
Open = Suburban + 18.4 dB

3.4.6 Give-Back Frequencies

All agencies participating in the use of the new 800 megahertz spectrum shall prepare and submit a plan for the abandonment of their currently licensed frequencies in the lower bands. The regional planning committees would have the freedom to consider below-800 MHz public safety bands in developing their regional plans, but the licensing of channels in these bands would continue to be conducted through existing frequency coordination procedures

coordinated, however copies of the Region 12 plan have been sent with letters requesting approval. The adjacent regions are: Washington (Region 43); Oregon (Region 35); Nevada (Region 27); Utah (Region 41); Wyoming (Region 46); and Montana (Region 25). As the use of the five National channels is not considered a day-to-day function, the "hard" coordination for the use of these channels is not considered to be necessary or advisable. The use of these channels will always be on a non-interference basis, with on-the-air coordination at the time of use when required. Any user found to be operating in any manner other than this shall be considered to be operating improperly and subject to the existing Federal Communications Commission rules for willful interference with the communications of other users.

3.5 Initial Spectrum Allocation

3.5.1 Frequency Sorting Methodology

The initial spectrum allocation for the Region was determined by a computerized frequency sorting process performed by APCO. The purpose of the computer program which assigns frequencies to specific eligibles and to pools for future assignments is two-fold:

A) The assignments must result in a high degree of spectrum efficiency, and

B) The assignments must result in a low probability of co-channel and adjacent channel interference.

Since the desired output is a geographic sorting of frequencies, a method of defining geography must be part of the input. A list of the number of channels to be assigned in each geographic area is also required, along with the name of the eligible or pool.

Acceptable interference probabilities are determined for the Region. Frequency assignments are then made using a computer program which satisfies the goals of spectrum efficiency and interference protection. The following narrative describes the factors and process used by the computer program.

3.5.2 Geographic Area

For the purpose of this frequency sort, a geographic area is defined as one or more circles of equal radius. To the degree

3.5.3 Define The Environment

The environment of each system is defined according to the Okumura/Hata method of classifications. See page 17.

3.5.4 Blocked Channels

In the Region there are five mutual aid channels which must be

ratios provide an acceptable probability of interference for Public Safety Services.

3.5.8 Adjacent Region Considerations

The computer program requires a listing of channels to be blocked along the borderline with other regions which have pre-existing plans. If the adjacent region plan was developed using the APCO packing program, this information exists in the database. If the adjacent region plan was developed by another method, then the data must be obtained from the adjacent region's plan in order to build the exclusion list.

4.0 COMMUNICATIONS REQUIREMENTS

4.1 Common Channel Implementation

The implementation of the International Common Channels must follow the guidelines as set forth by the Federal Communications Commission by the approval of the National Plan. These five common channels are accessible by all levels of government and shall be used in accordance with the provisions of the National Plan. All mobile and portable equipment must be equipped to operate in the "talkaround mode" when required on the International Channels.

The International calling channel (821/866.0125 MHz) shall be implemented as a full mobile relay. Wide area coverage transmitters will be installed where applicable within a system. Large system users (5 channels or more) of 800 MHz shall be required to monitor this channel at all times. The area of coverage for this channel shall be equal to the area covered by the licensed system. This may or may not require the use of satellite receivers within the area to meet this requirement.

The four International Tactical (ITAC) Channels will be assigned State-wide, for use as needed by all eligible licensees. These channels are to be used in accordance with the National Plan and in compliance with the regulations as set forth by the Federal Communications Commission. These channels require no special licensing, only that the users be eligible for licensing on the

4.1.2 Operation on The Common Channels

Normally, the five interoperable channels are to be used only for activities requiring inter-communications between agencies not sharing any other compatible communications system. Interoperable channels are not to be used by any level agency for routine, daily operations. In major emergency situations, one or more ITAC channels may be assigned by the primary Public Safety Agency within that area of operation. The primary Public Safety agency in each county, if not defined elsewhere in the plan, shall be the County Sheriff's Department or Public Safety Department or the lead agency, which may be any agency licensed to operate in this spectrum, or "on-scene" commander. The primary Public Safety agency shall be the city level Public Safety Department in situations which occur within the corporate limits of said city. These primary agencies will assign one or more of the ITAC channels for use according to need during each special situation requiring the use of these channels.

Participants in the interoperable channels include Federal, State, and Local Disaster Management agencies. Police, Fire, and providers of Basic and Advanced Life support services will be the primary using agencies. If radio channels are available, other services provided in the Public Safety Radio Services and the Special Emergency Radio Services may also participate to the extent required to insure the safety of the public. These agencies include the Highway Department, Motor Vehicle Comptroller, Forestry, Wildlife and other special service agencies not normally involved in day-to-day public safety operations.

4.1.3 Operation Procedures

On all Common Channels, plain English will be used at all times, and the use of unfamiliar terms, phrases, or codes will not be allowed.

4.1.3(I) International Calling Channel (ICALL):

The ICALL channel shall be used to establish contact with other users in a particular Region that can render assistance at an incident. This channel shall not be utilized as an ongoing working channel. Once contact has been established between agencies, an agreed upon ITAC or mutual aid channel shall be used for continued communications.

4.1.3(II) International Tactical Channels (ITAC-1 - ITAC-4):

These frequencies are reserved for use by those agencies involved in inter-agency communications. Incidents requiring multi-agency participation will utilize these frequencies as directed by the control agency assuming responsibility for an incident or area of concern. These frequencies may be subdivided according to function

in an incident or by geographical location in response to an incident. It is recommended that the following assignments for ITAC-1 through ITAC-4 be used when possible.

ITAC-1..... Law Enforcement
ITAC-2 .....Fire Services
ITAC-3 .....Emergency Medical Services
ITAC-4 .....Command and Control

4.1.4 Coded Squelch

All equipment capable of operating on the five (5) common channels shall be equipped with the National Common Tone Squelch of 156.7 Hz. Mobile relays on these channels, if authorized, may use additional tone or digital squelch codes for the purpose of selecting individual mobile relay stations, provided the National Common Tone Squelch Code is used on the output. If such an arrangement is utilized, provision must also be made for certain centralized, high level sites to be activated by the 156.7 tone to ensure emergency access by transient units.

4.2 Network Operating Methods

Communications systems on ITAC-1 thru ITAC-4 will be implemented by agencies who volunteer on a distributed coordinated basis. Every primary geographic section of the Region is intended to be covered by at least one of the ITAC channels. In many areas the common channels will be utilized on a mobile to mobile talk-around basis. Mobile relays on ITAC-1 thru ITAC-4 will be on a limited coverage design to permit reuse of the channel several times within the Region and in adjacent regions. Since Region 12 will probably not have a large number of stationary ITAC Channel stations, the implementation of mobile relay or repeaters is strongly encouraged. This will fill an "on-scene" requirement for most multi-agency response situations. Adjacent region coordination will be via existing mutual aid coordination procedures with the requesting region establishing the tactical frequency assignment.

4.3 Requirements For Trunking

All systems operating in the Region having five or more channels will be required to be trunked. Those systems having four or less channels may be conventional. It is strongly suggested that any entity licensing three or more repeaters use trunking.

The FCC in its Report and Order states: "Exceptions will be permitted only when a substantial showing is made that alternative technology would be at least as efficient as trunking or that trunking would not meet operational requirements. Exceptions will not be granted routinely. Strong showings as to why trunking is unacceptable must be presented in support of any request for exception."

Systems that do not meet FCC loading standards can be required to share such frequencies on a non-exclusive basis. Those agencies requesting Data channels only can be required to share channels with adjacent agencies wherever feasible or limit coverage to their geographic area. Exceptions will be considered on a case-by-case basis by the Regional Review Committee.

Depending on systems loading and the need for multiple systems within an area, operators of wide area systems (including, but not limited to, designated "Monitoring Agencies") must provide for coordination between area-wide systems and "Monitoring Agencies". Single municipalities or agencies must restrict design and implementation of their systems(s) to provide only the communications needed within its geopolitical boundaries. The use of trunked systems is encouraged. However, if the total number of radios in service does not reach minimum loading criteria for a trunked system, that user must consider utilizing the next higher system level if 800 MHz trunked radio is available in the area. As

potables as a method of validating system loading. This exception shall apply to agencies having only one system and a single frequency. Agencies/jurisdictions requesting multiple frequencies or employing trunking technology shall comply with the loading standards as outlined below or provide a "Traffic Loading Study" that meets the criteria as outlined below.

4.4.1 Loading Tables

EMERGENCY		NON-EMERGENCY	
CHANNELS	UNITS/CHANNEL	CHANNELS	UNITS/CHANNEL
1 - 5	70	1 - 5	80
6 - 10	75	6 - 10	90
11 - 15	80	11 - 15	105
16 - 20	85	16 - 20	120

Agencies requesting additional frequencies must show loading of 100 percent or greater on their existing system. Should a demand for frequencies exist after assignable frequencies become exhausted, any system having frequencies assigned under this plan four or more years previously and not loaded to at least 70 percent will lose operating authority on a sufficient number of frequencies to bring the system into compliance with the 70 percent loading standard. Frequencies lost in this manner will be reallocated to other agencies to help satisfy the demand for additional frequencies.

4.4.2 Traffic Loading Study

Justification for adding frequencies, or retaining existing frequencies, can be provided by a traffic loading study in lieu of loading by number of transmitters per channel. It will be the responsibility of the requesting agency to provide a verifiable study showing sufficient air time usage to merit additional frequencies. A showing of air time usage, excluding telephone interconnect air time, during the peak busy hour greater than 70

4.5 Use of Long Range Communications

During incidents of major proportions, where Public Safety requirements might include the need for long-range communications in and out of a disaster area, alternate radio communications plans are to be addressed by Primary Public Safety agencies within this sub-region. These agencies should integrate the appropriate

progress of the planning effort were taken. These individuals or agencies were sent all announcements for meetings and bulletins of progress.

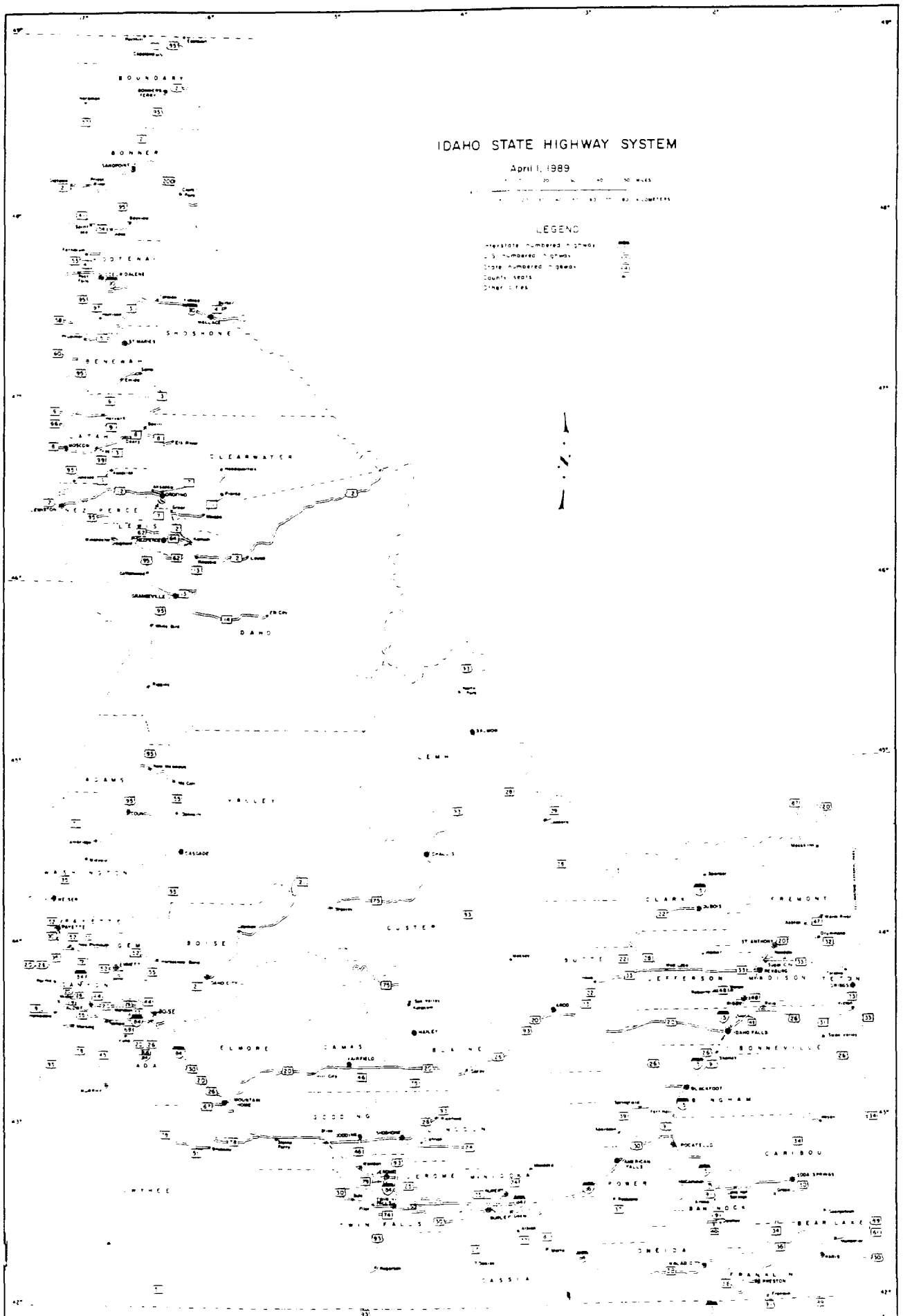
When the work on the plan was completed, a final planning committee meeting was called. This meeting was held at the Idaho State Police complex on January 22, 1993. Each member of the planning committee was presented with a draft copy of the plan for study. A copy of the final draft was mailed to each member of the committee not present at the meeting. Each plan contained a ballot for voting on the acceptance of the plan.

As with the formation of the committee, a public notice was placed in the Idaho Statesman Newspaper announcing the completion of the plan and the intention to file with the Federal Communications Commission.

5.2 Frequency Allocation Process

The method used for "packing" Region 12 was the APCO computerized method. The approximate geographical location for the center of each county, in latitude and longitude, were provided along with the environmental type of the county and the approximate radius to cover the county lines. Along with this information, a list of frequencies to block along the adjacent region's border was included. The actual assignment of frequencies is for two (2) channel-pairs per county.

This allocation is the minimum and only applies to counties with a population of 20,000 or less. A minimum of one additional channel is allocated for each additional 20,000 of population. For example: A county which initially has been allocated only the minimum of two (2) channels, will generally be eligible for a third channel after it's population reaches 40,000. Considerations other than population must be addressed by the Regional Committee if reasonable justification is made. The state of Idaho has reserved 40 channels statewide plus five (5) proposed Regional Mutual Aid


IDAHO STATE HIGHWAY SYSTEM
April 1, 1989
LEGEND
BOUNDARY
BONNER
KOOTENAI
SHOSHONE
BENEWAH
LATAH
CLEARWATER
NEZ PERCE
LEWIS
IDAHO
ADAMS
VALLEY
WASHINGTON
PAYETTE
GEM
BOISE
CUSTER
LEMHI
CLARK
FREMONT
SUNSET
JEFFERSON
MADISON
TETON
CANYON
ELMORE
CAMAS
BLAINE
BONNEVILLE
ADA
GOODING
JEROME
MINIDOKA
TWIN FALLS
POWER
BINGHAM
CARIBOU
BANNOCK
BEAR LAKE
ONEIDA
FRANKLIN
CASSIA
OWYHEE

5.4 Assignment Statistics

CHANNEL ASSIGNMENTS BY COUNTY

COUNTY	CHANNELS
Ada	604, 606, 622, 642, 644, 660, 680 682, 698, 700, 718, 736, 738, 756 774, 776, 795, 797, 815, 817
Adams	720, 740
Bannock	622, 624, 660, 662, 698, 700, 737
Bear Lake	797, 817
Benewah	660, 698
Bingham	774, 776, 794, 814
Blaine	626, 664
Boise	702, 723
Bonner	737, 776, 796
Bonneville	644, 646, 666, 682, 684, 758, 778 799
Boundary	774, 794
Butte	604, 642
Camas	624, 662
Canyon	608, 627, 665, 721, 741, 758, 778 799, 819
Caribou	704, 760
Cassia	607, 628
Clark	623, 661
Clearwater	736, 774
Custer	699, 796
Elmore	646, 684, 760
Franklin	721, 741

CHANNEL ASSIGNMENTS BY COUNTY (continued)

COUNTY	CHANNELS
Fremont	625, 663, 780
Gem	629, 780
Gooding	702, 779
Idaho	661, 776
Jefferson	739, 816
Jerome	704, 798
Kootenai	721, 723, 742, 744, 746, 778, 817
Latah	700, 718, 738, 794
Lemhi	680, 718
Lewis	623, 796
Lincoln	719, 721
Madison	648, 668, 801
Minidoka	742, 820
Nez Perce	627, 665, 798, 819
Oneida	702, 780
Owyhee	723, 743
Payette	667, 705
Power	609, 630
Shoshone	780, 814
Teton	686, 796
Twin Falls	706, 708, 725, 781, 800, 802
Valley	648, 801
Washington	686, 762